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Soil Conservation

SOIL CONSERVATION SERVICE • U. S. DEPARTMENT OF AGRICULTURE

VOL. XXVII, No. 7 FEBRUARY 1962

Growth Through Agricultural Progress

Soil Conservation 25 Years Ago

"Projects throughout the United States prove not only that erosion can be controlled but that it is possible for the average farmer himself to undertake the conservation of his chief asset, the soil.

"Cost reductions, revealed by carefully kept records in all regions of the Soil Conservation Service, are being brought about as a worthwhile by-product of mounting efficiency and increased simplicity of methods."

•

"In various projects and camps many special tools have been devised which make it possible for the field work of the Soil Conservation Service to be done much more efficiently. Both major and minor pieces of equipment have undergone changes to fit them to particular tasks and to local conditions."

•

"At Sligo, Pa., costs of controlling gullies have been cut by the substitution of diversion ditches for expensive check dams, where that is feasible."

CONTENTS

PAGE

147 Rurbanization A Major Conservation Challenge
By Donald A. Williams

148 California's Urban Sprawl
By Fred W. Herbert

150 Soil Surveys Help Urban Planners
By Bernhard A. Roth

152 Virginia's Fairfax County Rurban Action
By J. E. Beard

154 Georgians Meet a Rurban Problem
By Sellers G. Archer

156 Non-farmers In Pittsburgh Area Seek Conservation Help
By William Lucas and Joseph A. Krivak

158 Grass Rotations Boon To Vegetable Business
By C. B. Blickensderfer

159 Puts Seep Water To Work
By Gordon S. Smith

160 Report of the Administrator, Soil Conservation Service, 1961

168 Book Review

COVER—The march of urban developments onto farmland near Norristown in Montgomery County, Pa.

Soil Conservation

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Secretary of Agriculture

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Administrator, Soil Conservation Service

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FRANK B. HARPER, Editor

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Rurbanization

A Major Conservation Challenge

By Donald A. Williams

IT is of significant interest to conservationists and any number of other people that a whole new set of words have worked their way into our everyday vocabulary —words like "rurban," "megalopolis," "urban sprawl," "suburbia," and so on.

These and companion newcomers to our current literature and conversation reflect an almost overnight public awareness of one of the most spectacular socio-economic phenomena of our times. That is the nearly complete swing of the pendulum from our erstwhile predominantly rural land occupany in the United States to today's overwhelmingly urban concentration of our 185 million people.

More than a million acres of our agricultural land is being shifted to suburban housing, industrial, highway and airfield, and other nonagricultural uses every year. Extremists on the one hand decry this trend as entirely evil, and one that must be halted at any cost. Others, equally extreme in their unconcern, contend we have nothing to fear, that we need never worry about where our food and fiber are coming from.

Fortunately, there is a middle-ground, which soil and water conservation is demonstrating with increasing conviction year after year to be feasible and practicable. It is a question of facing up to the realities of the situation—from both viewpoints.

First, the rural-urban population movement is not altogether black, as witnessed by the fact that our national production, income, and gross economy today are at an all-time high. More people, including the 1 out of 10 who are left on the farm, are enjoying more of the material good things of life than ever before. In any event, this urban movement is not to be denied. It is reality, and it will continue.

At the same time, we cannot close our eyes to a potential ultimate reversal of this still habitable situation. The future will not take care of itself if we do not take advantage today of those opportunities we have for avoiding major future land and water-resource problems. In short, we need to give attention to the conserving and orderly development of soil and water resources, in order to meet the demands of the 333,000,000 people we are expected to have in the United States by the year 2000, and to meet conceivable emergency needs.

> Rurban (blend of rural and urban). 1: relating to or living in a community, zone, or town which is principally residential but where some farming is engaged in. 2: situated or living outside of the city limits but not on a farm.
> *Webster's Third New International Dictionary.*

The Soil Conservation Service is the agency of the Department of Agriculture having primary responsibility for providing, on non-Federal lands in cooperation with other agencies, technical assistance in soil and water conservation planning and land treatment to landowners and operators and to communities in watershed projects. As such, it seeks to encourage a sane balance among conflicting demands upon the Nation's land and water resources. It has already been amply demonstrated in a number of affected areas that those concerned with resource use and management can work effectively to help bring about proper land use and sound soil and water conservation in rurban localities.

Good advice in the planning stage, for example, helps to avoid irreparable mistakes in land use, and provides for the future application of practical and beneficial conservation measures. The Soil Conservation Service works through soil conservation districts and local planning or other responsible groups in acquainting rural-urban interests involved with information on soils and some of the fundamentals of good land and water planning. That does not mean the Service helps prepare farm conservation plans as such in those areas; but there is an area of fringe suburban acreages that are not city lots—the "rurban" edge where urban developments spill over onto the rural farmlands—on which SCS gives counsel on soil and water land-use problems.

More and more responsible planning and other interests recognize that conservation of our soil, water, grass, timber, wildlife, and recreational resources depends upon community support and action. We are well on our way to developing a positive "community consciousness" of such situations, and should see more widespread results through such undertakings as multiple-purpose watershed development and still more activity in land-use and related resource planning and action.

California's Urban Sprawl

Brings Conservation Problems

By Fred W. Herbert

THE movement of people to the West Coast and to California in particular during the last decade has been described as the largest human migration in history. This "population explosion" is dramatized in the press as an unprecedented phenomenum.

Perhaps the earliest record of California as a population-attracting magnet was a statement made more than a century ago, in 1846, when Pio Pico, the last Mexican Governor of California, lamented:

"We find ourselves suddenly threatened by hordes of Yankee emigrants, who have already begun to flock into our country, and whose progress we cannot arrest. Already have the wagons of that perfidious people scaled the almost inaccessible summits of the Sierra Nevada, crossed the entire continent, and penetrated the fruitful valley of the Sacramento. What that astonishing people will next undertake, I cannot say; but in whatever enterprise they embark they will be sure to prove successful."

Resource conservationists, who believe that welfare of people rests on the productive capacity of soil and an abundant supply of water, have attempted to assess the impact of today's urban development upon these resources. They also recognize that people must have living space, but that guidance is needed to minimize the effects on land and water resources.

News stories in 1955 told how farmers were being pushed off the land by growing cities. The articles pointed out that of 100 million acres of land in California, only 14 million acres were cultivated, including 7 million irrigated acres. They said that since World War II, approximately 40,000 acres of farmland had been taken over by approximately 22,000 residential subdivisions.

In many instances, farmers have been forced to sell when their lands were taxed at potential subdivision values rather than on the basis of agricultural production. An article published in 1961 cited specific instances of tax increases on farmland, ranging from 139 to 650 percent. It stated that ranchers felt there is no justification for assessing on the basis of land-speculation activity when the land is still in farming and the owner's intention is to continue to farm it.

Much more has happened to land in California since 1955. Farmlands in so-called "pressure" subdivision areas have sold for 4 to 10 times their value as farmland. Adjacent farmland has been assessed accordingly. This has been the law.

The California Association of Soil Conservation Districts, representing 160 districts covering about two-thirds of the State, has been uneasily watching urban sprawl and its conquest of more and more of the State's best farmland. And the 1959 report of the California

Home builders move into English walnut orchard on Class I land in Contra Costa SCD near Walnut Creek, Calif.

Note:—The author is assistant State conservationist, Soil Conservation Service, Berkeley, Calif.

This County of Santa Clara Planning Dept. picture in California shows how many small subdivisions eventually join to form the pattern of urban sprawl.

Soil Conservation Commission referred to this movement as "the Octopus of Urbanization." A report about that time by Karl J. Belser, director of planning for Santa Clara County, warned:

"Recent surveys show that in California not a single metropolitan area where high intensity agricultural development exists has escaped the pressure of the urbanizing process. Since over 50 percent of the State's best soil lies in such metropolitan areas the threat of overrunning this soil is obvious."

Estimating that for each person who comes into the State, one-fourth of an acre of land will be taken out of other uses and placed in urban use, Director Belser reached the conclusion that "If urbanization follows its present pattern, that is, absorbing all the flat valley land, it is possible that by 1990 there may be no agricultural land left in the State." He found that close to 756,000 acres of fine agricultural land already may have been overrun, even though it was not all built up, in the Los Angeles-San Diego area, the Central Valley, and the many coastal valleys.

It was about the same time that a soil and water study was begun in California as part of the National Inventory of Soil and Water Conservation Needs. The State-by-State, county-by-county inventory was made cooperatively by representatives of the Soil Conservation Service and other U. S. Department of Agriculture agencies with other Federal, State, and local agencies and groups concerned.

The California inventory, completed in 1961, estimated that 1,672,800 acres will be going into urban uses by 1975. Of this acreage, 1,217,000 acres is in the better I to IV land classes, and 758,000 acres is now in cropland. Total cropland acreage is expected to increase by only about 5 percent by 1975, despite the expectation that the State's population will increase to 21 million by then, or an increase of about 60 percent over 1961.

This indicated shift of land out of agriculture into urban use is a significant inventory finding. Such losses, in the face of a greatly increased population, can have a major impact upon the whole country. California, for example, produces, among many other crops, most of the almonds, walnuts, dates, plums, prunes, apricots, avocados, peaches for canning, lemons, figs, wine grapes, early table grapes, olives, and artichokes grown in the Nation.

Also significant is the fact that urbanization is intensifying and complicating watershed problems and making it more necessary than ever to protect lives and property from floods. The State conservation needs inventory found that a thousand watersheds will need project action by 1975, on some 18 million acres.

California has undergone a period of experimentation with legislation designed to protect farmlands from urban encroachment. The Legislature passed a "pilot" bill in 1955 designed to limit the annexing powers of cities as they affect areas zoned exclusively for agriculture use. A

second bill passed in 1957 directed assessors to use only the value of land as it relates to agricultural use for assessment purposes.

A concurrent resolution passed by the 1961 California Assembly and Senate will place a constitutional amendment before the voters in 1962. This amendment provides for the assessment of land used for agricultural purposes to be based on agricultural factors only. It also provides that if such land is diverted to another use, it shall be subject to additional taxation, under specified conditions.

Governor Edmund G. Brown voiced the sentiments of Californians concerned over the future of natural resources when he said at the 1960 convention of the California Association of Soil Conservation Districts:

"As Governor, I do not intend to preside over the liquidation of much of the finest agricultural land in the Nation, indeed in the free world. This administration cannot sit idly by while unchecked disorderly urban expansions erode and obliterate our agricultural resources. Failure to act boldly and wisely now will mean that much of our irreplaceable cropland . . . will become part of the tragic inventory of natural resources carelessly lost forever through man's greed and ignorance. This must not and will not be."

Soil Surveys Help Urban Planners

By Bernhard A. Roth

PLANNERS of fast growing urban communities in Connecticut have turned to the soil scientists for help.

As a result, a newly found, common interest in soil and its potentials has created an unique partnership between city men and farmers in Hartford, Danbury, Stamford, and half a dozen other localities. Professional planning consultants have prophesied that the exchange of soil knowledge now going on between dairymen and crop growers on the one hand, and urban officials on the other, may revolutionize methods of community planning and zoning.

Soil maps, it was found, reveal considerably more than where to place cornfields and pastures. Interpreted by Soil Conservation Service technicians, the maps also show the severity of slope and erosion, wet and dry areas, flood hazards, and seepage problems. Here was intelligence that fascinated developers.

After a session on soils information with farmers of the Fairfield County Soil Conservation District, Danbury's town planners requested a special soil map of their 42-square mile domain. Farmers and their assisting SCS technicians responded by providing what they termed an "abbreviated" map of local land resources, that gave a full-length portrait of soil and water conditions. Using it as a base reference, Danbury's professional planners designed a master layout to allocate housing, industry, schools, shopping centers, and roadways for 30,000 additional

This home development in Fairfield County, Conn., is on the hill in Ansonia overlooking the Housatonic River.

Note:—The author is field information specialist, Soil Conservation Service, Upper Darby, Pa.

L. to r.—Walter Wachter, director of planning and zoning; Mayor J. Walter Kennedy; David B. Thompson and Albert E. Newby, both of SCS, discuss Stamford, Conn., land resource unit map.

residents expected in the future.

Third-dimensional information furnished by the soil survey gave planners an outstanding advantage. It no longer was necessary for them to guess at what construction men might face. Eleven different land-resource classifications outlined by the map showed underground phenomena, in addition to surface features. For example, a tracing of upland soils indicated that water-infiltration rates likely would be too slow to handle septic seepage, and that road construction and maintenance would be costly.

Poor sites for houses and industry were markedly clear in soils mapped along streams and rivers. There, soil scientists pointed out, developers would face double-trouble in the form of difficult drainage and frequent flooding.

Planners looked closely at the map's delineation of terrace soils. Here, soil surveyors had underlined a potential for nearly all types of agriculture. Likewise, they had noted the soil's eminent suitability for high density, urban development—good drainage, flood-free, and affording easy excavation. Danbury and towns that had followed suit in requesting resource maps over the past year have received, in essence, a rating of all local soils according to such limitations as drainage, suitability for septic tank functions, flooding hazard, depth to bedrock, stoniness, and excessive slope.

Communities have drawn upon

Section of land resource unit map depicting Stamford's soil inventory.

the maps heavily to substitute orderly progress in place of chaotic, urban sprawl. Decisions as to type of development, as well as location, have been supported by the natural resource data. Rulings as to size of houselots have been less subject to criticism when bolstered by scientific soil findings. Real estate men have been guided to money-saving land treatments prior to building. Inexpensive and previously unknown sources of road-fill and landscaping materials have come to light by means of the maps.

The soil map method also has offered a hedge against the endless monotony of subdivision. For instance, Stamford used its resource guide to allocate a 30-acre swampy area as a wildlife preserve. Similarly, Danbury, flood-terrorized in recent years, has dedicated streambank areas to the interests of naturelovers. The same areas will serve to protect sites for future flood-prevention structures.

A few of the towns are planning to purchase easements aimed at reserving their richest farmlands. Use of the resource maps to locate and conserve future water developments is a noticeable trend in all communities involved in the current movement.

Farmers in the Fairfield County SCD in the county's northernmost town of Sherman feel that farming should be preserved as long as possible.

Virginia's Fairfax County Outstanding In Rurban Action

By J. E. Beard

AN article in a Washington, D. C., newspaper on January 1, 1961, stated that during 1960 fifty-two manufacturing plants located or made final plans to locate in Virginia, bringing employment to about 4,100 persons. In addition, 49 plant expansions were announced during this period, affecting approximately 4,000 additional employees in 33 of these expansions.

The report did not include new establishments in wholesaling, retailing, agriculture, transportation, or Government; but it gives a brief picture of expanding industrialization throughout the State.

The impact of these new manufacturing plants is greater than most persons realize; because, for each person employed by the industrial plant, another person is needed to provide the goods and services in the community where the plant is located. Additional people are employed to bulldoze the soil; burn the trees, farm houses, and barns; bury the wire fencing; dig the sewer lines; lay the water mains; build bridges; and otherwise cover up little streams. As soon as these operations are completed, the roads and streets have to be resurfaced; since those already existing were chipped away, and cracks and soft places have developed in the new ones hastily built.

Next come additional filling stations, lunch bars, trailer parks, and school teachers. Then someone has to build housing to replace the trailer parks and school rooms to house the school teachers and children.

Fairfax County's population jumped from 98,000 in 1950 to 240,025 in 1960, while farms declined from 1,656 to 428. Our experience in the Northern Virginia Soil Conservation District seems to indicate that we would be remiss in our duties and responsibilities if we did not use the entire resources of the Soil Conservation Service, including its professional leadership and technical staff, to defend the basic principles on which the conservation program has been established. If efforts are started soon enough, engineers, builders, and developers in rurban areas soon learn that many potential problems are avoided, many thousands of dollars are saved, and the people in the surrounding rural areas are assisted immensely.

Fairfax County's urban development had not reached Leo. J. Rocca's 206 acres of grassland farming in Northern Virginia SCD.

My second observation is that potential rurban expansion causes a period of uncertainty. Farmers are reluctant to make permanent improvements in buildings, fences, soil fertility, drainage, and soil and water conservation, even though prices of farmland begin to rise and local markets expand. There is also a tendency to exploit some of the fertility already there —sell sod, topsoil, etc.

Thirdly, when urbanization starts in a given area, prices of farmland begin to rise out of proportion to those of agricultural areas a few miles away from this point. According to U. S. Census figures, prices of farmland, plus buildings, in Fairfax County were $113.69 per acre in 1940, $356.28 in 1950, and $752.53 in 1960; whereas, the average value of farm real estate, including buildings, throughout Virginia in March 1960, was listed as $141.15 per acre. Our $750 an acre land does not produce higher crop yields, or carry more livestock per acre than the good $141 an acre land in other areas.

It should be pointed out here that Fairfax County is not the only county losing farms, since the Federal Census also shows that during 1954 through 1959 the number of farms in Virginia dropped from 136,416 to 97,623 with an average loss of 7,758 farms per year during this period.

Next on the list is the expansion of public services such as schools, libraries, sewer lines, water mains,

Note:—The author is Fairfax County Extension agent and secretary of the Northern Virginia Soil Conservation District, Falls Church, Va. (Excerpts from talk at 1961 meeting of the Virginia Association of Soil Conservation District Supervisors.)

This 1937 aerial photo taken over a northeastern Fairfax County, Va., area shows the sparse development and open country still typical in most outlying environs of the Nation's capital.

police protection, and recreational parks. Taxes increase and farmers and landowners have to share in the increased tax burdens, even if they do not use the increased public services provided by rurban expansion.

The multiplying public and private agencies in a metropolitan area which have, or should have, a continuing interest in conservation present constantly increasing opportunities for extending the conservation effort. We have never been able to keep all of our constantly changing public officials informed with respect to the position, responsibilities, and performance of the soil conservation district, and progress toward a common planning and coordination of effort leaves much to be desired.

In soil conservation districts covering rurban areas, the supervisors can make their greatest contribution toward the broad objectives of the conservation program by a continuing effort to encourage and coordinate participation in that program by other interested local, State, and Federal agencies, and by taking a lead in those situations where the independent action of the other agencies may be difficult or impossible because of limits of jurisdiction or authority.

You cannot separate soil and water conservation problems of rural or urban areas. Sooner or later each group is taxed to pay for the costly mistakes of the other. The Northern Virginia Soil Conservation District found it necessary to revise its work program in 1958 to include rurban problems.

Use of a detailed soil survey is absolutely necessary in rurban as well as rural sections if those responsible for the use of the land are to make wide decisions based on fact. In Fairfax County, the farmers, the County Planning and Zoning Commission, the Health Department, the Department of Public Works, the County Department of Schools, and the Department of Assessments all are using a detailed soil survey. A full-time soil scientist is hired by the county and attached to the local Farm and Home Department so that through him, along with the Soil Conservation Service, the Agricultural Stabilization and Conservation Office, the Forest Service, and the Extension Service, all citizens,

This view of the same area taken in 1953 shows that urbanization got an early start here. Today, such urban congestion has spread into much of Fairfax and other Virginia and Maryland counties in the southwestern corner of the Atlantic Seaboard Megalopolis.

including real estate developers and individual homeowners, can receive the best possible information.

I am convinced we are saving the local county government several thousand dollars a week in their construction costs alone. Much more ultimately will be saved through the prevention of costly mistakes in the handling of our rurban soil and water problems. Our experience in Fairfax County indicates that the proper use of soils is our number one common denominator. We believe it will continue to be so in all rurban areas for some time to come.

Georgians Meet a Rurban Problem

Head On—*and Fast*

By Sellers G. Archer

THE people of Muscogee County in southwestern Georgia moved fast in doing something about the flood and other problems brought on by rapid urbanization of farmland in the Bull Creek watershed.

Instead of waiting its regular turn to get Federal help in planning the watershed for its protection and flood prevention, the county reimbursed the Soil Conservation Service $8,000 for the cost of a preliminary survey, and then about $30,000 more for costs involved in making the completed watershed plan. And to avoid any delay in obtaining voluntary easements, the county voted a $600,000 bond issue—even before Congress had approved the watershed plan—to buy all the structure sites, except one on the Fort Benning Military Reservation.

This family had enough of drying furniture and cleaning after floods and was moving.

Next, in order to get construction started as soon as possible, it set its engineering and land procurement departments to mapping land ownerships and the area needed for purchase. The first three sites already were being cleared for construction in the fall of 1961.

The project thus is conspicuous for the full cooperation between the urban and farm groups concerned and unified action by the county government and the Pine Mountain Soil Conservation District.

Prime mover behind the watershed undertaking has been John Rigdon, a practicing soil conservationist for 30 years and a supervisor of the Pine Mountain district since it was organized in 1939. When he couldn't get the county or city governments to push the watershed project the way he thought they should, he ran for county commissioner and was elected. He "sold" the project to his colleagues, to every important organization, to most of the business leaders, and to landowners up and down the watershed and the citizens of Columbus.

For many years Rigdon ran a dairy on Lindsey Creek, near Columbus. Between his farm and town ran Weracoba Creek. Both are tributaries of Bull Creek. He saw every flood on both creeks and on the main stem of Bull Creek.

Rigdon carried maps around for 3 years to help explain watershed project.

Urbanization hit the Weracoba watershed first. Rigdon saw the floods become more fierce and destructive as more land was put under buildings and concrete and compacted yards. Now the Weracoba watershed is almost completely urbanized, and it will cost many millions of dollars to solve the flood problem.

The town grew rapidly, and

Note:—The author is field information specialist, Soil Conservation Service, Spartanburg, S. C.

Rigdon finally sold his home farm for urban developments. As additions leap-frogged up Lindsey Creek, he saw floods growing worse there, too. A flood back in March 1943 covered a large part of his pasture. There now are 50 to 75 homes within this flood area, and the same kind of rain today would push the high water mark nearer to the 100-year flood stage.

This is just one of many rurban areas subject to flooding. Where Lindsey Creek joins Bull Creek, there is a flat area where 1,200 homes are subject to flood damage. In one newly urbanized area, the county airport contributes to the depth of flooding. When it was built, the runoff from farmlands above could be carried in a 108-inch pipe under the 30-foot fill on which the east runway is built. Now this outlet is inadequate, and a flash flood backs water into homes. When the watershed above is fully built up, two more 108-inch tubes, estimated to cost $361,000, will be needed to handle the floodwater.

Growing floods have caused increasing damage to roads, bridges, farm and urban improvements, and to farmland. Other land cannot be developed, because of the flood hazard. Sediment from upland erosion must be dredged from stream channels each year.

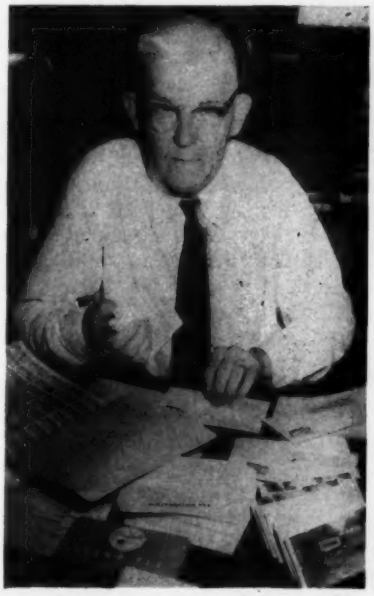
"Channel maintenance and bridge repair cost $50,000 to $75,000 a year," Rigdon said. "And there seemed to be no end to these steadily mounting costs as the town expanded—at least there wasn't until we developed a plan for the watershed where there are still rural areas and room for the establishment of protective measures."

The plan calls for 11 floodwater-retarding reservoirs and 12 miles of steam-channel improvement. Some of the sites are surrounded by built-up areas, and a few houses will have to be moved or protected by dikes. Others on farmland are within Columbus' prospective expansion area. The county accordingly plans to develop each site, of about 100 acres, as a recreation area, with a lake (the sediment pool) averaging 18 acres.

The Bull Creek watershed plan also includes cropland contour farming, stubble mulching, cover cropping, and other practices; nearly 4,500 acres of pasture planting or improvement; more than 9,000 acres of timber-stand improvement or tree planting; and treatment of critical areas.

East Linsey Drive runs through Rigdon's old dairy farm.

Conservation With Tax Notices



Lee County Treasurer Frank Deschamps preparing tax notices for mailing with conservation brochure.

"Lee County (S. C.) is the garden spot of the Carolinas" has become the theme of an annual pubblication mailed by County Treasurer Frank J. Deschamps to taxpayers. Three pages in the one issue told why. In them, Soil Conservation Service technicians discussed the county's productive land and reported on soil conservation activities.

Deschamps' first three issues of, "Interesting Facts Concerning Lee County" were 4-page folders containing general statistics and tax information. Then in 1959 the folder was doubled in size, and included reports from the agricultural agencies, with the soil conservation postage stamp featured on the back page. The water conservation stamp was featured in 1960.

Deschamps says he has had favorable comments from all over the country.

Non-farmers In Pittsburgh Area

By William Lucas and Jose

PENNSYLVANIA'S Allegheny County with the city of Pittsburgh as its hub is one of the many metropolitan areas of the country that have experienced the march of homes and shopping centers through the farmlands and open areas of a few years ago. One-half of the 467,000 acres within its boundaries already is classified as urban, and within 10 years an expected 20 percent of the remaining acres will be.

Directors of the Allegheny County Soil Conservation District, working with the Soil Conservation Service, recognized the need for a policy to guide them and cooperating agencies in meeting their rurban conservation needs. Requests for technical assistance on soil and water conservation problems from landowners other than farmers increased each year. Today, 8 out of 10 soil and water conservation inquiries come from non-farm landowners! A work plan accordingly was developed which budgeted the district's resources to meet this demand.

In some areas, the demand for technical assistance by rurban landowners has been in competition with that from farmers. In this district, the needs have been compatible. The district directors believe that developing a plan to budget their resources has enabled them to satisfy the conservation needs of both groups.

Odds are good that any time earth is moved in Allegheny County, erosion will become a serious problem if the soil isn't quickly tied down with vegetation. But requests for assistance are varied. They range from stabilization of a critical area caused by construction on a 30 percent slope to working with the County Parks Department on long-range plans for conservation development of the 7,000 acres in the park systems.

Planning help for water-disposal systems is common need in new subdivisions.

Building houses in hilly country causes soil and water problems.

There is an intense interest in conservation on the part of many rurbanites. The J. Lewis Scotts of Fairview Heights, a small community a few miles east of Pittsburgh, provide a good example. The acres surrounding their home appear to have been transported from an untouched forest. Native hardwoods blend with transplanted wildflowers and shrubs. In 1960, community progress required the construction of a sewage system through Powers Run, a small, undisturbed stream running through the Scotts' property.

Anxious to restore the glade to its natural beauty, the Scotts and cooperators of the Allegheny County Soil Conservation District developed a rurban conservation plan, which included riprapping of the streambanks to contain the stream in its bed, and

Seek Most Conservation Help

Lucas and Joseph A. Krivak

Seeded and mulched slope was stabilized in 6 weeks.

treatment of critical areas to minimize erosion. Plantings included grasses, legumes, shrubs, and conifers to stablize the streambank and surrounding areas, and also to provide food and cover for wildlife.

The Scotts' interest also has included conservation projects at the community level. As a member of the O'Hara Township Park and Recreation Commission, one of Mrs. Scott's goals is setting aside areas in which the natural features are integrated with recreational needs. Three of these "parklets" have been obtained, and a nursery has been established to provide seedlings for these and other areas.

Additional planning assistance was given to the Park and Recreation Commission on Meadow Park, overlooking the Allegheny River and a large part of Pittsburgh's industrial complex. A Little League Baseball diamond has been developed and the rest of this 34-acre park is being developed for recreational activities. The conservation program includes a water-disposal system, tile drainage, reshaping and vegetating banks, and planting tree and shrubs for erosion control, wildlife food and cover, and aesthetic purposes.

Soil Conservation Service personnnel also has given technical assistance to the Fox Chapel Park Commission in the development of a 35-acre wildflower and wildlife sanctuary. The heavy use made of this area caused soil and water conservation problems which needed prompt attention to streambank stabilization and critical-area treatment.

Level land, much prized for industrial development, no longer is available in Allegheny County. Industry, like the homeowner, has had to use less desirable sites. Land-use problems are a predictable hazard in these cases. A typical example is the 50-acre research center of a Pittsburgh glass company. The center is on top of one of the ever-present hills in this part of the State. Construction left steep, raw banks where leveling operations stopped. Water running off the acres of roofs and parking areas resulted in almost 100 percent runoff. Leading the water safely down or around the steep slopes was one of the foremost problems. Here design and construction were based on the knowledge that failure in this area of high hazard would be costly.

Almost without exception, rurban landowners also have as one of their primary objectives development of their land to increase wildlife food and cover.

Community development of water resources for recreation is increasing.

Note:—The authors are, respectively, work unit conservationist, Pittsburgh, Pa., and State soil conservationist, Harrisburg, Pa.

Vegetable beds on cleared flatwoods land to be planted to grass and clover after 1 or 2 years.

Grass Rotations Boon To Florida Vegetable Business

By C. B. Blickensderfer

FLORIDA landowners are using grass in rotations to renew their soil and help keep the State in the winter vegetable business.

In South Florida, where high-value vegetable and flower crops require soil relatively free of disease organisms and insects, landowners used to let the land lie idle after the growers to whom they rented it had raised only one or two vegetable crops. It stayed out of production until the soil was renewed by native vegetation. The owners received little or no profit from this volunteer range. Money spent on drainage and irrigation systems brought them no returns until the land could be rented to vegetable growers again.

South Florida is a relatively flat area of sandy soils, with many marshes and natural lakes. Elevation ranges from sea level to 25 to 100 feet in the interior. The low, grassy swamplands known as the Everglades are in the extreme south, but the area actually includes all of the peninsula as far north as Daytona Beach. It contains 17 million acres.

For years owners cleared the land in blocks of 100 to 200 acres, protected it from flooding by dikes, and ditched it for drainage and subirrigation. Vegetable and flower growers leased the land for one or two crops. When there was excess water it was pumped out of the ditches and over the dikes.

Ordinarily, irrigation is needed during most of the growing season, and water is pumped into the ditches to provide seepage irrigation. That meant, too, that a water supply had to be available.

Then, after one or two seasons, the cost of fighting plant diseases and insects became prohibitive, even with the efficient chemicals that have been developed; and the costly, highly developed fields had to be abandoned. But this is no longer true, thanks to the grass-vegetable rotations soil conservation district landowners are working out with Soil Conservation Service technical help.

A relatively inexpensive, highly productive pasture of bahia and pangola grasses can be established immediately. The residue of the high fertilizer on vegetable crops gives the grass a quick, strong growth. Then white clover is overseeded to improve the pasture.

Drainage and irrigation facilities provided for the vegetable crop are used to keep the pasture producing at top efficiency. Good management practices are used. Carrying capacity often reaches two cows, with calves, to the acre.

After 3 to 5 years of profitable pasture use, the land again is ready for vegetables, with their production as good as on virgin soil.

This conservation practice not only is aiding Florida's winter vegetable business, but also adds to the improved pasture that helps give the State a high ranking position in the cattle industry.

Note:—The author is plant materials technician, Soil Conservation Service, Palmetto, Fla.

Irrigated pangola grass-clover pasture following vegetables produces high beef gains.

Puts Seep Water To Work All Around the House

By Gordon S. Smith

SUBURBAN homeowners with water-seepage problems might take a tip from the experience of a New Hampshire farmer.

Michael Maloney of Somersworth turned seep water that bogged down his new homesite into multiple-purpose benefits by laying tile lines under the 1-acre plot and collecting the otherwise useless water for use in his house and to fill a backyard swimming pool.

The Maloney family bought their 88-acre farm 21 years ago. Mike remembers fishing in the old mill pond, though it was largely filled with silt. His father attempted to dry up the area by filling the pond, but the ground was always too wet to use.

By 1947, Mike was a married man and needed a new home.

"The old pond site next to the river was always my favorite spot," he recalls. "Dad gave me the useless land and thought I was crazy to try to build there. It was wet, but I had an idea."

Maloney had learned a few tricks about soil and water conservation from Soil Conservation Service technicians working with the Strafford County Soil Conservation District, who had helped his father plan conservation work on the farm. Tile lines under wet pastures had done wonders then. Maloney figured they should work as well on a homesite.

While the house was being built, he laid a tile line all the way around the foundation. He put in a cement desilting basin and a small storage well behind the house, and ran pipe from there into the house. A ⅓-horsepower pump put the water into the house water system.

Tile lines and desilting boxes insure clean, fresh water for swimming pool.

"It hasn't run dry in the 13 years we've had it," Maloney says.

The one tile line cut water seepage around the house, but the backyard was still wet. He next intercepted two main seep areas with two more tile lines and joined them in a desilting box near the first tile line. This made a total of 200 feet in all.

Then he built an 18x36-foot cement pool about 40 feet from the new lines, with a pipeline from the desilting box to a second box near the pool. There the water had to seep through sand and gravel to flow, by gravity, into a third box next to the pool. From there, cool, clear water, up to 12 gallons a minute, runs into the pool, even in dry weather. Maloney added a cutoff valve so that, with all the lines feeding in, he can fill the 35,000-gallon pool in about 36 hours.

When the pool needs drainage, a valve opens a pipe at the pool bottom and sends water through the overflow pipe to the river, about 20 yards away.

Maloney estimates that by laying the tile himself, the pool and drainage cost him about $1,000.

The Maloneys enjoy their improved recreational area.

Note:—The author is field information specialist, Soil Conservation Service, Upper Darby, Pa.

Report of the Administrator Soil Conservation Service 1961

THE Soil Conservation Service found itself in perhaps the most active and productive period in its history as the 1960-61 fiscal year ended and the new year began. The increasing challenge to its technical capacities reflected, in turn, accelerated public awareness of soil and water conservation problems and needs, and the determination of responsible leaders—local, State, and Federal—to move ahead on the conservation job at a faster pace realistically timed to its urgency.

Watershed-protection and flood-prevention projects, of the widest public appeal and community benefit among the programs in which the Service has nationwide responsibility, were representative of the steady upward progress in the conservation march ahead. So was the achievement of soil conservation districts, which the Service has primary responsibility to serve with technical help. The number of landowners signing Great Plains Conservation Program cost-sharing contracts during the year further reflected the healthy conservation progress of the Nation as we moved on into the challenging 1960's.

Another key guide to conservation planning and action was beginning to be made available during the first half of 1961 to agricultural, planning, and other people who need it. That is the information developed in the Department of Agriculture's cooperative National Inventory of Soil and Water Conservation Needs.

There are several significant aspects to these correlated approaches to the Nation's complex land-use and water-management problems. Each of these programs or activities has demonstrated its effectiveness in meeting the particular need for which it was designed; but, operating together toward a common purpose, their impact in moving conservation ahead to strengthen the national economy is multiplied.

All of them, for example, are contributing to sound rural area development, a most important aspect of our whole economy in these fast-moving times of declining farm numbers and of mechanization, continuing shifts in population from agricultural to urban areas, and other trends. Thus multiple-purpose watershed projects, because of their basic community organization and goals, are particularly well adapted to carrying out rural areas development. So is the Great Plains Conservation Program in hazardous climatic areas of that region. And so are soil conservation districts, which first demonstrated the practicability and effectiveness of the rural community improvement approach to land and water and related problems. Soil survey and conservation needs information already is or can be a basic tool for use in rural area planning and development.

Many trends in agriculture, and in the national economy of which it is such an important part, influence the direction of soil and water conservation. The trends of recent years, plus the necessity for a healthy, profitable agriculture, give further indication of conservation direction. Even though the production capacity of our cultivated lands is greater now than current demands for food and fiber, at least for several commodities, this fact does not lessen the necessity for continuing aggressive soil, water, and plant conservation for managed abundance.

The United States is undergoing significant adjustments in land uses, and will continue to do so. Whether one accepts the low, medium, or high estimates of population increases by the years 1975, 2000, or 2010, pressures on these resources will pyramid. As confirmed by the conservation needs inventory, significant shifts out of agricultural uses into nonagricultural uses such as industry, recreation, transportation, water surfaces, and living space will continue at perhaps an even faster pace. There will be shifts, also, from grass and woodlands into cultivation. It is probable that by 1975 there will be but a small net decrease in cultivated lands and forest lands, but significant increases in grasslands.

Note:—This article is a digest of a report for the fiscal year 1961 submitted to the Secretary of Agriculture by Donald A. Williams, Administrator of the Soil Conservation Service.

We are at the beginning of a new and decisive period in our national conservation effort. To meet our food and fiber needs a scant 15 years hence, to say nothing of the year 2000, we will need the production equivalent of 200 million more acres, as based on 1956 yields. This production patently must come largely from existing cropland.

So it is that, even by 1975, there will need to be improvements in soil management, disposal, or prevention of excess water on good soil, added water for dry soils, reduction of soil losses resulting from water erosion on sloping lands and wind erosion on dry lands, improved soil-moisture-nutrient relationships, and such other adaptations of conservation technology as are consistent with soil capability and efficient farming. All relate to the fundamental base—the soil—for agricultural production in the amount needed when we need it.

Current and emerging trends in American agriculture continue to lead to the need for more, not fewer, specialized services in soil and water management, from both private and public sources. This fact emerged more clearly during the last fiscal year than ever before. Meanwhile, the Soil Conservation Service has sought to gear its efforts to the changing times; because the essence of conservation is concern for the future—not the preservation of the past.

Among the situations coming more sharply into focus is the increasing significance of the characteristics of the thousands of different soils, especially with respect to moisture and fertility relationships, with more attention needing to be given to the trace elements and to managing moisture availability. Another has been the necessity of giving more attention, in view of the out-of-agriculture trends in land uses and the need for more water impoundment, to shifting low-capability land to recreational, residential, defense, and other nonagricultural purposes. This calls for matching land use better to its capability, with intensive cultivation on the better land and the use of marginal lands for grass or trees.

Much land needing conservation treatment no longer is farmland. Conversion of open country to residential, industrial, and other nonagricultural uses, at the rate of more than 1 million acres a year, leads to such complex problems as finding stable soils that will support structures, preventing floods and sedimentation of streams and reservoirs, providing drainage and sewage disposal, and adjusting taxes. The public interest therefore calls for conservation of soil and water irrespective of agricultural production needs.

The same conservation programs, services, and information that serve in rural areas continued to prove themselves during the year in these nonagricultural situations, especially the small-watershed and soil conservation district programs, including soils and conservation needs information. The Service more recently has been called upon for more and more consultation concerning conservation problems on nonagricultural land. Such technical advice is limited to assistance covered by agreement between soil conservation districts and landowners, and is provided through official boards and groups of owners.

Although modern science and technology continue to change the goals and methods of conservation, they have not altered the underlying principles which must guide its application if conservation is not to be fragmented and proper local governmental and agricultural leadership by-passed in carrying out needed conservation works. It has continued to be Service policy to encourage in every way possible that these fundamentals are adhered to. One is that the people concerned have a desire to get the conservation job done, and the incentive to move ahead in doing it.

Another is that farm and ranch conservation planning is the key to getting conservation done, whether through soil conservation district programs, watershed-protection and flood-prevention projects, or the Great Plains Conservation Program. It also is important that the farmer examine his conservation program from time to time, to make sure he is not doing just "patchwork" conservation but that his program is related to his total resource needs.

By the same token, the Soil Conservation Service and soil conservation districts have found it is important for them to keep their programs up to date, in order to keep abreast of changing conservation needs. To this end, consideration is being given in the Department of Agriculture to modernizing the memorandum of understanding between the districts and the Department, so as to take into account the broader aspects of today's conservation effort.

Progress during the 1961 fiscal year in Service-assisted programs is summarized by specific activities:

Conservation Needs Inventory

One of the potentially most significant items of progress during the fiscal year was completion of the National Inventory of Soil and Water Conservation Needs. It **provides county, State, and Federal private and governmental interests the best**

and most complete information ever available on the Nation's privately owned land and water resources and the size of the soil and water conservation job ahead.

Although inventory figures still were subject to final checking and adjustments in some counties and States, many counties and a few States had refined and published, or were in the process of publishing, their inventory data by the fiscal-year end; and work was proceeding looking to early publication of the national inventory summary.

The soil survey, land-use, and land-capability data have been recorded on punch cards and identified so they can be compiled by any political subdivision, natural land-resource area, or watershed.

The inventory indicates that the acreage of non-Federal cropland, now about 640 million acres, will decrease by at least 2 percent, by 1975; pasture and range will increase 3 percent overall; and forest and woodland will decrease by about 2 percent.

The biggest net change is expected to be in land converted to urban and other nonagricultural uses. The more than 20 million acres that will go out of agriculture will be offset in part by about 5 million acres of new land coming into agriculture, making a net conversion of 15 million acres by 1975, or about 1⅓ million acres a year.

The inventory indicates that about two-thirds of the non-Federal land used for cropland, pasture, or woodland needs some kind of conservation treatment; while about one-third is adequately treated or, like the 40 million acres of Class I cropland, needs no special conservation practices. Soil erosion is the dominant problem on more than half the cropland.

Importantly, also, the conservation needs inventory delineated approximately 13,000 natural watersheds in the United States of sizes suitable for project development through the Watershed Protection and Flood Prevention Act and the Small Reclamation Projects Act. The inventory committees found that project action of some kind is needed in about 8,300 of these watersheds.

Soil Conservation Districts

Totaling an even 2,900 at the end of the fiscal year, soil conservation districts included 96 percent of the Nation's farms and 92¼ percent of its land in farms, or 1,038,100,955 acres and more than 3,560,000 farms and ranches. Oklahoma, on January 17, 1961, was the latest of 23 States, Puerto Rico, and the Virgin Islands to be covered completely by districts since these local units of State government began organizing in 1937 under State enabling laws patterned for the most part after the model act suggested to the governors by the President. More than 1.8 million farmers and ranchers, operating about 594 million acres, were cooperating actively with their districts.

Soil Conservation Service aid to the districts likewise was stepped up in every way possible. This renewed effort was aimed at helping the districts to speed their agricultural resource betterment work so important to the Nation's economy and assurance of its ability to produce food and fiber in the amounts needed, when needed, for its added millions of people expected in the waning quarter of the 20th century and beyond, or in time of emergency.

The Service gave technical help to 2,883 districts during the year. It helped landowners and operators to develop 102,781 basic conservation plans on 36,906,598 acres, bringing the total of such plans to 1,358,290 covering 405,898,414 acres. Another 28,467 plans on 15,215,000 acres were revised and brought up to date.

In the interest of greater efficiency in their operations, small districts in some instances were consolidated during the year; and multiple-county districts in other cases were split into separate districts by individual counties. Twenty-five districts were involved in these realinements, and 26 entirely new districts were organized by farmers and ranchers during the year, for a net increase of 33.

Watershed Protection and Flood Prevention

Watershed Protection (P. L. 566).—**As of June 30, 1961, a total of 1,505 applications for Federal assistance in developing projects including 106,558,000 acres under this act had been received by the Department of Agriculture from 48 States and Puerto Rico, including 186 applications from sponsoring local community organizations during the fiscal year. Meanwhile, 659 projects totaling 46,603,000 acres had been authorized for planning, including 93 approved during the year.**

Forty-eight projects were authorized to receive Federal technical help for planning and installing land-treatment measures and making engineering surveys and designs required in advance of construction. This brought the total projects approved for Federal assistance in the installation of works of improvement to 312. Of those, 204 had been authorized for the construction of structures called for in the watershed plans, 58 of them this year.

During the year, 239 floodwater-retarding structures were completed in P. L. 566 watershed projects, and 117 more were under construction on June 30. The total number of such structures completed by the year end was 471. Improvement work was finished on 156 miles of stream channels during the year, for a total completed to date of 339 miles. Land-treatment work progressed on all the small watersheds approved for structural work.

Watershed Protection (Pilot).—Only 20 of the 62 pilot watershed-protection projects originally approved for Federal assistance in 1953 remained to be completed at the end of the 1961 fiscal year. Projects completed totaled 35, and 7 had been terminated with concurrence of the local sponsors.

Flood Prevention (11 Authorized Watersheds).—**Work plans were prepared for 12 subwatersheds and one subwatershed area covering 1,277,623 acres in fiscal year 1961. These brought to a total reported to date of 313 subwatershed and minor watershed work plans covering nearly 20 million acres. It was estimated that installations were completed as of June 30 on 106 subwatersheds and 29**

subwatershed areas that included approximately 3½ million acres. Conservation land treatment likewise was accelerated in these subwatersheds.

River-Basin Activities

River-basin investigations were started or continued on 14 major rivers during fiscal year 1961, in cooperation with the States involved and with other Federal agencies concerned with water storage, flood control, or navigation.

The Soil Conservation Service represented the Department on five Inter-Agency River Basin committees: Arkansas-White-Red, Missouri, Columbia, Pacific Southwest, and Northeastern (Resources Committee).

The Department of Agriculture continued its cooperation in river-basin surveys and investigations with other Federal or State agencies, with overall responsibility for these activities assigned to the Soil Conservation Service, one of the principal agencies of the Department concerned, along with the Economic Research Service and the Forest Service.

Investigations were under way during the year in these river basins:

Delaware River.—The Department is cooperating with the Corps of Engineers in a review of its reports. The survey has proceeded in accordance with a work plan developed by SCS, FS, and ERS representatives comprising a Field Advisory Committee. A Joint Engineering Work Group developed information on the storage potential and other features of possible reservoirs within the basin. The Department's participation in the cooperative survey was completed during the year.

Potomac River.—The Department is cooperating with the Corps of Engineers in a review of its reports on this basin. The Soil Conservation Service has developed information on storage potentials in small and intermediate size reservoirs for correlation with that on potentials for storage in large reservoirs developed by the Corps. Fieldwork on this survey is essentially completed.

Lower Mississippi River and Tributaries.—The Department cooperated with the Mississippi River Commission in a review of the Corps of Engineers' report. During the year, the Department completed a report on the agricultural potential of selected project areas in the Mississippi alluvial valley, utilizing data developed in the cooperative investigations; and the Mississippi River Commission completed the review survey report.

Yazoo-Mississippi River (Miss.).—The Department is cooperating with the Mississippi Board of Water Comissioners in a comprehensive survey of land- and water-resource development on approximately 6 million acres in the Yazoo-Mississippi flood plain and the bluff area in Mississippi. The objective of this survey is to obtain information to be used by the Department in identifying opportunities for P. L. 566 watershed projects.

Tombigbee River (Ala. and Miss.).—The Department also is cooperating with the Mississippi Board of Water Commissioners in a survey and investigation of this basin. Information developed is to be used by the Department to determine, among other things, opportunities for P. L. 566 watershed projects. The information will be used by the Board of Water Commissioners also.

Colorado River Storage Project.—The USDA Field Advisory Committee composed of representatives of the Economic Research Service, Forest Service, and Soil Conservation Service and the Land-Grant Colleges set up to coordinate the activities of departmental agencies and the colleges continued, in cooperation with the Department of the Interior, reappraising the direct agricultural benefits to be expected from the participating projects of the Colorado River Storage Project. The project reports also provide information on the relationship between project facilities and adjacent watershed lands and the impact of the various projects on national forest lands and improvements.

Fieldwork has been completed on the Silt Project in Colorado and on the Emery Project in Utah; and is under way on the Lyman Project in Wyoming; and reports are being prepared. Work has been discontinued on the Central Utah Project.

Cape Fear River (N. C.).—The Department continued cooperation with the Corps of Engineers and the State of North Carolina in a survey of the Cape Fear (including the Haw) River Basin in developing alternate plans for the reduction of floodwater and sediment damages and the utilization of its water and related land resources. A joint report, completed and submitted to members of Congress concerned, presented two alternative methods for the development of the water resources of the basin for agricultural, industrial, municipal, recreational, and other uses.

Upper Mississippi River and Great Lakes Basin Areas.—The Soil Conservation Service is cooperating with various field offices of the Corps of Engineers in the Upper Mississippi River and Great Lakes Basin areas to determine the effect upon agricultural lands and crops of proposed major drainage projects of the Corps of Engineers. Project reports were completed during the year on the Lookingglass River in Michigan and on Hog Creek in Ohio; and survey work is under way on others.

Upper Willamette and Deschutes River (Oreg.).—The Department continued cooperating with the Oregon State Water Resources Board in a water-resources survey and investigation of these basins to obtain information with a view to the coordinated development of their water resources. This survey also will provide information for assisting local organizations in developments under the Watershed Protection and Flood Prevention Act, about opportunities for development of water on national forests as a part of multiple-purpose development of the natural forest resources; and as a basis for providing technical help to farmers and ranchers. The draft reports on these surveys have been prepared.

Bayou Bartholomew (Ark., and La.). The Department continued its cooperation with the Corps of Engineers in a survey of this basin, particularly of the hill section. The general objective of the upland survey was to formulate a watershed-treatment program, including systems of floodwater-retarding structures. The Department's report on this survey has been completed.

Humboldt River (Nev.).—The Department likewise continued cooperating with the Nevada Department of Conservation and Natural Resources in a comprehensive survey to provide a basis for planning and developing this basin's water and related land resources. A draft report on the survey of the Little Humboldt River sub-basin has been prepared, and substantial progress was made on the Pine Valley sub-basin survey.

Arkansas River Multiple-Purpose Project (Ark. and Okla.).—The Department also continued cooperating with the Corps of Engineers in a survey to develop information on the effects that project works of the authorized Arkansas River Navigation Project may have on lands adjacent to the Arkansas and Verdigris Rivers.

Sevier River (Utah).—The Department's cooperation continued with the State of Utah in a comprehensive survey of the water and related land resources of this basin. The State of Utah and the Sevier River water users need information on the possibilities for solving some of the complex land and water problems of the basin.

Gunnison River (Colo.).—The Department is cooperating with the Colorado Water Conservation Board in a comprehensive survey to provide a basis for planning and developing the water and related land resources of this basin. A work plan for the cooperative survey has been prepared, and initial survey activities have begun.

Soil Conservation Service representatives continued to serve as Department advisers to Federal members of various

commissions negotiating inter-State compacts.

Great Plains Conservation Program

Out of 422 counties authorized to participate in this program, 361 counties in the 10-State area had been so designated by June 30, 1961. In addition to the 6,947 cost-sharing contracts covering 18,082,351 acres which had been signed by farmers and ranchers by the fiscal-year end, there were 2,927 applications covering 9,145,000 acres on hand.

Farmers and ranchers signed 2,217 contracts under the program during the 1961 fiscal year. These contracts cover 5,302,685 acres, and are aimed at stabilizing the participating operating units through better land use and the application of enduring conservation measures with the help of long-term cost-sharing where needed. A total of 3,118 applications were received for assistance on 7,182,004 acres during the 1961 fiscal year.

A total of 607,964 acres, or 28.3 percent of all the cropland on participants' farms or ranches, had been planned for conversion to permanent vegetation since the beginning of the program, most of it under program plans. Planned land-use conversion during the year totaled 163,392 acres, or 27.4 percent of the participants' cropland. The 88,496 acres of rangeland planned for reseeding during the fiscal year brought the total for this major practice to 557,447 acres since the start of the program. Other cost-sharing practices include terracing, stockwater ponds and wells, stripcropping, tree windbreaks, water spreading, and other measures needed for developing basic conservation plans.

The Great Plains Conservation Program continued to draw the attention of soil and water conservation districts and other interests elsewhere in the country, because of its basic feature of being tailored to fit the specific needs of an area having common climatic, erosion, and other problems, thereby setting a pattern potentially applicable in other areas.

Soil Surveys

Soil surveys are first in order among the technical facilities which the Soil Conservation Service provides to landowners and operators through the soil conservation district and other programs in which it has responsibilities. These surveys are basic to all of its conservation planning, which in turn results in the blueprints for soil and water conservation land treatment and water management.

Requests for information about use of soil maps in urban planning and construction work continued to increase during the last year. Requests also continued for guidance in the use of soil maps and reports for tax-assessment purposes. Public demand for soil survey information was spurred further as a result of initial availability of the conservation needs inventory information. Soil survey information, aside from its primary usefulness to farmers and ranchers, is a particularly valuable tool for use in county or community planning, and for other purposes.

Soil Survey Operations.—**Soil surveys were made on more than 55,750,000 acres during the 1961 fiscal year, compared to approximately 50,160,000 acres the year before, an increase of 11 percent.**

More than 700,563,000 acres had been surveyed and mapped by June 30 in enough detail for soil and water conservation planning of farms and ranches and small-watershed projects. The mapped acreage represents about 37 percent of the country's total land area.

Of particular note the last year were the number of States that had completed conversion of soil conservation surveys to standard soil surveys. Standard soil surveys are being made in 1,885 areas, of which 830 are being mapped progressively. Procedures also were developed for making standard soil surveys of extensive grassland areas, for use in ranch planning.

The soil survey always has been a cooperative undertaking with the Land-Grant Colleges. This cooperation has continued to expand; and the Soil Conservation Service now is cooperating with the Forest Service, Bureau of Indian Affairs, Bureau of Reclamation, and the Bureau of Land Management. In addition, the need for soil maps and interpretations by local planning groups is so great that they are making money available to the Service for soil maps and interpretations and, in some cases, for specific data normally not collected in a soil survey.

Soil Classification and Correlation.—The number of established and tentative soil series in the United States still stood at nearly 7,000 at the close of the last fiscal year. A total of 194 tentative series were proposed; 119 series were established; 111 tentative series were dropped after testing; and 42 series established earlier went onto the inactive list because of conflicts with other series.

A total of 146 initial field reviews were completed during the year, many of them representing conversions of conservation surveys to standard surveys.

Work on a revised nationwide system of soil classification was continued, with publication of the 7th Approximation of a comprehensive system of classification. Further trials in the grouping of series in families, groups, and subgroups in the 7th Approximation also were made.

Several joint field studies with principal soil correlators, State soil scientists, and others were made in parts of States or along common boundaries of two or more States. These studies are designed to improve the definition of soil series, the characterization of soils, and interstate correlations.

Soil Survey Interpretation.—Thirty-seven edited soil survey reports, with maps, were sent to the Government Printing Office during the fiscal year. These, with 16 other soil survey reports at the plant, made a total of 53 in the Government Printing Office awaiting publication. Meanwhile, 36 soil survey reports and maps were published. Approximately 90 soil surveys were in various stages of soil correlation and report manuscript preparation as of June 30.

Nearly all manuscripts now contain engineering interpretations, and most of them include groupings of soils into woodland suitability groups or range sites, or both.

Several contain such other groupings or interpretations as those for suburban uses, sewage disposal, special irrigation groupings, or wildlife interpretations. More soil interpretation and descriptions of soils for nontechnical readers increase the value and use of published soil surveys.

Work progressed satisfactorily in the development of criteria and procedures for using climatic data in making soil interpretations and in the placement of soils in capability and other interpretative groupings.

Soil Survey Investigations.—A new, comprehensive system of soil classification was published in preliminary form for distribution at the Seventh Congress of the International Soil Science Society. It is applicable not only to the soils of the United States but to those of the rest of the world. It is hoped that its use will

facilitate application of knowledge gained throughout the world to problems of soil use in this country.

Studies of world-wide distribution of radio-active fallout were continued for the Atomic Energy Commission. Results of the studies to last June 30, which showed that the bulk of the stronium 90 had fallen out of the atmosphere by that time, were published jointly with the U.S. Weather Bureau.

Cartography.—Increased emphasis on the small-watershed protection and flood-prevention program during the 1961 fiscal year was one important item resulting in a greater need for cartographic assistance. Continued emphasis was placed on the need for producing a greater quantity of soil maps of high quality. Soil maps for 13 counties and projects were completed during the year and made ready for the printer; and printed soil maps were finished and distributed for 37 counties and projects. In addition, mapping operations on 150 other counties and projects were in some stage of work.

Production of farm and ranch plan maps continued to require a major part of the Service's cartographic resources. This work is given high priority, with the maps produced and delivered to the field without delay. A total of 409,503 prints of soil and capability maps for 150,699 farms and ranches were produced. Conservation plan base maps involving 503,849 prints were produced for 178,361 farms and ranches.

The Cartographic Division processed 6,875 film packs and produced 389,032 contact prints and enlargements for the States during the year. Outstanding color photographs were taken by the documentary photographers for the soil survey exhibit at the International Soil Congress and for the "Water for America" series in preparation at the fiscal-year end.

Specifications were written and contracts awarded for eight special-purpose aerial surveys, all but two of which had been completed, and one standard 1:20,000 aerial survey.

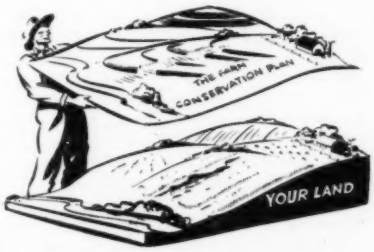
Increased lithographic production of maps and related materials was reported by virtually all units.

Farm and Ranch Planning

On Farms and Ranches.—Farm and ranch planning is basic to any sound conservation treatment and management of farm or watershed lands. The rapidly changing agricultural conditions under which farmers and ranchers operate make it absolutely necessary that we who are assigned responsibility for helping them apply their conservation systems keep our technology up to date. We accomplish this by keeping our work unit technical guides under continuing review and revising them as new technology develops.

Soil conservation district cooperators developed 102,781 basic conservation plans during the 1961 fiscal year, covering more than 36 million acres. This was an increase of about 4 percent over the preceding year's plans. In addition, 28,467 basic plans, for more than 15 million acres, were revised and brought up to date. At the end of the year, 1,358,290 farms and ranches, involving more than 405 million acres, had the benefit of such basic soil and water conservation plans; and 213,298 of these basic plans had been fully applied.

On Nonagricultural Land.—Some of the worst erosion and siltation problems occur on nonagricultural land. It therefore is not surprising that the number of requests coming to the Service for help on such land continues to grow, particularly in soil conservation districts near expanding population centers.



Although the Service is in the best position to provide nonagricultural landowners and users with technical advice, its primary obligation is to assist soil conservation districts, and it does not take unilateral action on requests for help on nonagricultural lands.

Instead, the Service asks the districts concerned to establish appropriate priorities for servicing such requests. Then, to the extent possible, the aid given is (1) restricted to consultation, (2) covered by an agreement between the soil conservation district and the landowner, and (3) provided through boards, commissions, and committees or associations and groups of owners.

Increasingly wide use of the information developed by the needs inventory will be made by Service technicians, both those working with landowners and operators in rural areas and those in metropolitan areas.

Land Treatment

All possible emphasis continued to be placed on helping soil conservation district farmers and ranchers to apply conservation practices to the land in accordance with a basic plan, as part of a coordinated land-treatment program as specified in the plan. Special efforts also were made to speed up the conservation treatment of land in all small watersheds approved for structural works of improvement.

Some of the major conservation practices applied by district cooperators with SCS technical assistance during the year include:

More than 13.9 million acres of conservation cropping systems; 3¼ million acres of contour farming; 4½ million acres of cover cropping; 12.9 million acres of crop residue use; 658,500 acres of stripcropping.

Also, 3¾ million acres of pasture improvement; 2¼ million acres of pasture planting; 3½ million acres of rotation grazing and 15½ million acres of deferred grazing; 41 million acres of proper range use; and 902,000 acres of range seeding.

Also, 708,000 acres of tree planting, including farmstead windbreaks; nearly 1¾ million acres of woodland improvement, and more than 3¾ million acres of woodland protection; and 437,000 acres of wildlife area treatment.

Also, 56,000 acres of grassed waterways; 55,670 farm ponds built; 42,850 miles of terracing; 279,000 acres of land grading and smoothing; 2.1 million acres of improved irrigation water application; and 1.6 million acres of drainage improvements.

The significant progress in application of conservation on the land during the year is reflected in the fact that 15 of these 20 measures showed increases over the year before, most of them in most substantial amounts.

Group job measures installed in fiscal year 1961, benefiting about 27,680 farms and 1.8 million acres, included 170 miles of irrigation canals and laterals built; 1,500 miles of ditch channels constructed, or improved; 151 miles of stream-channel improvement and 23 miles of streambank protection; and 1.6 million cubic yards of spoil-bank spreading.

Plant Technology

The past year saw continued progress in the various phases of conservation planning and accomplishment that deal with the use of vegetation and its management. The following examples illustrate this:

Soil-Loss Predictions for Wind Erosion Areas.—Research data on soil losses from wind action became available in sufficient detail that Service agronomists in the Great Plains States during the past year were able to develop specifications for wind erosion control comparable to those for water erosion control. This provided work unit conservationists with

several alternatives for advising farmers on combinations of wind-strip width in relation to amounts of residue to be left on the surface for soil protection. Guides also were developed for use of proper tillage equipment related to the suggested techniques.

More Use of Stubble.—High winds caused considerable damage to unprotected fields in some parts of the Great Plains during the spring of 1961, but there was little or no damage where farmers followed Service specifications for stubble mulching.

Consequently, there were more good stubble-mulched fields in the Great Plains this past year than ever before. One State reported an increase of 80 percent last spring as compared to 1958. This increase attests to the fact that the work unit staffs now are equipped to advise farmers on proper methods, and that there has been a concerted effort at all levels of the Service to encourage stubble mulching.

Meanwhile, mulch planting, a practice that has been in a trial stage in South Carolina and Georgia was tried during the year by farmers in other southeastern States. The practice embodies the principles of minimum tillage by planting row crops, such as soybeans or corn, in the previous crop stubble without prior seedbed preparation. It has proved to be an excellent erosion-control measure when performed on the contour; and when it is used with terraces or contour stripcropping, soil and water losses are further reduced. Yields are maintained, and the cost of production is reduced as much as $8 to $10 an acre.

Fish and Wildlife Enhancement in Small-Watershed Projects.—Plans for fish and wildlife enhancement increased materially in watershed work plans. In the Northeastern States, for example, there now are approximately 30 such enhancements in various stages of development. These include trout-stream improvement and fish and wildlife developments, including waterfowl marshes and fishing waters.

In Pennsylvania, preparations are under way for the development of a master plan for fish and wildlife resources involving six neighboring watersheds and a State and a Federal waterfowl refuge. A single watershed project in Utah, the Sanpete, includes 535 acres of waterfowl-marsh development, 150 acres of new fisheries, and 4,300 acres of winter range for big game. Similar achievements were made in several other regions.

Woodland Conservation in Soil Survey Reports.—Far greater accomplishments in the interpretations of soil survey information for the growth of trees and production of wood crops have been evident in recently published soil survey reports than ever before. Field specialists in woodland conservation, working with soil scientists, have grouped soils into woodland suitability groupings and developed ratings of the soils in each group in terms of their suitabilities for use and treatments needed for optimum production of wood crops.

Woodland suitability groupings have provided a basis for the simplification of prescribed treatments for both protection of soil and water resources and the use of trees for the economic advantage of landowners and operators.

Better Plants for Soil and Water Conservation.—In the Southeast, a wild reseeding soybean, found in eastern Tennessee, was tested in North Carolina for its use by wildlife. East India bristlegrass (Setaria barbata), evaluated at the Arcadia, Fla., Plant Materials Center, was found to be especially shade tolerant in orange groves.

In the Northeast, the Big Flats, N.Y., Center selected several promising accessions for increase to provide sufficient seed for field evaluation. Among them were big trefoil; a vigorous strain of deertongue selected in New York that shows promise for use on sand blows and other infertile sites; a leafy selection of switchgrass from New York that tolerates wet and droughty sites; an erect, thick-stemmed ecotype of switchgrass that withstands snow and remains erect over winter, of potential value for pheasant and rabbit cover; and a low-growing, dense form of timothy that seems promising for waterways.

In the Cornbelt, a superior selection of Crownvetch was widely tested and released as Emerald Crownvetch, in cooperation with Iowa State University. Medium purple willow gained wider acceptance in protective windbreak plantings in truck gardens on Michigan muck lands; while in Kentucky and Missouri, it was found useful in stabilizing gullies and for controlling steep banks. Amur bush honeysuckle was developed at the Elsberry, Mo., Center and proved useful for winter wildlife food and cover in several Cornbelt States.

In the Great Plains, a selection of tall wheatgrass, named Largo and originated at the Los Lunas, N. Mex., Center, was released for certification by the Colorado Crop Improvement Association, because it proved superior to other strains on wet alkali sites. Seed of Greenville switchgrass, also from Los Lunas, proved especially well suited for range reseeding in the 16-inch rainfall area where other strains had failed.

In the West, Lana Vetch, released in 1957 by the Pleasanton, Calif., Center, gained a reputation for its versatility and reliability for range forage, bank stabilization in watershed projects, cover and green manure, and for wildlife food and cover. A strain of hard fescue developed at the Pullman, Wash., Center was certified by the Crop Improved Associations in Washington, Idaho, and Oregon.

The National Plant Materials Center.—Approximately 750 accessions were added to the list of possible conservation plants for evaluation, small-scale increase, and further distribution from the National Center at Beltsville, Md. The new plant materials assembled at this Center came from 45 countries. In return, requests for materials came to the Service from 27 countries.

Range Improvement on Sandy Lands in the Southern Great Plains.—More and more ranchers dramatically increased the productivity of sandy rangelands in the southern Great Plains. On tens of thousands of acres, a combination of brush control and deferred grazing has increased forage production remarkably. Range improvement on such land is taking place in west Texas, western Oklahoma, eastern New Mexico, northeastern Colorado, and southwestern Kansas.

In many instances, such rangelands have changed from brush to grass in 2 to 4 years, increasing production of perennial grass in some cases from several hundred pounds to more than 3,000 pounds of air-dry herbage to the acre.

Engineering

Special emphasis during the last fiscal year was put on increasing technical engineering efficiency in order to keep abreast of still sharply mounting watershed-project and other demands for this type of Service help and advice. Specific goals of giving the soundest available direction to all engineering aspects of the Service's participation in watershed, soil conservation district, and other programs include the assurance of having sound construction and getting full return for Federal and all other money invested in them.

Watershed project dams, for example, serving many people in the community and oftentimes involving municipal, recreational, or other purposes, are larger than those on individual farms. They accordingly require more complex engineering, from more extensive hydrological and geological investigations of sites to more complex structural designs. The Service therefore seeks to provide its engineers on the job, who are responsible for design and construction, with the most practical and helpful engineering guidelines possible.

Erosion-Control Practices.—Constantly improved guides for structural erosion-control measures also have been stressed. Thus there was continued improvement during the year in the design and installation of terrace systems adaptable to modern farm equipment. A part of

this improvement was increased acceptance by farmers of the idea of smoothing and leveling field surfaces in advance of terrace construction.

Irrigation.—Interest in P. L. 566 small-watershed projects involving irrigation work continued to increase. Many of the watersheds seem to pose new problems that involve the development of new analytical procedures.

Two successive years of short water supplies in parts of the West have increased interest in improving irrigation water-management practices, and all of the Western States are putting increased emphasis on this work. Good progress also was made in working with operators of the large sugar plantations in Hawaii on irrigation water management.

Substantial time and effort were put into the "National Standards for Irrigation Practices." These now are essentially completed and will aid materially to incorporate more uniformity and better engineering into all of the Service's irrigation fieldwork. There has been increasing interest on the part of the U. S. Bureau of Reclamation in obtaining more advanced technical resource information from the Soil Conservation Service, to assure efficient use of water in new projects.

Drainage.—There was a significant increase in requests for assistance of drainage engineers in P. L. 566 watershed planning and operations. This was because of an increase in the number of projects involving land drainage. Help was provided with the design of several large pumping plants to be installed in such projects. Interest has increased in tile drainage of citrus orchards in Florida.

Continued progress was made in preparing adequate drainage guides, especially in adapting them to drainage in irrigated areas. National standards were developed for four of the most important drainage practices and submitted for review. Interest has continued in drainage of woodlands in the Southeast.

Water-Supply Forecasting.—Snowfall during the 1960-61 winter season was extremely deficient over a wide area of Arizona, California, Nevada, Utah, and Wyoming, and extended into southern Idaho and southeastern Oregon. It was the third year of drought in some of these areas. Irrigation reservoir storages have been depleted.

A major effort was undertaken well in advance of the irrigation season to warn farm and other water users of the impending shortage, through issuance of special snow survey reports and advisory notices or brochures on irrigation water management. The water-supply forecasts also were used by Federal and State Governments in determining allocation of funds and taking other actions to alleviate 1961 drought effects. Several specialized forecasts also have been developed.

An economic study of the value of forecasts was made for the 1960 season on the Salmon Falls Tract in Idaho. It showed a saving of about $300,000 on 31,000 irrigated acres as a result of actions taken by farmers based on water-supply forecasts. The cost of surveys in this area was only about $2,000.

Hydrology.—The most significant increase in the hydrologic aspects of Service work was in interagency cooperation on water-resource development. Service hydrologists, to illustrate, participated in several river-basin studies and in activities of various interagency and other water-resources committees.

Cooperative projects of the Service and other Federal agencies continued to provide more hydrologic data and improve hydrologic techniques. A computer program also has been developed in cooperation with a private data processing firm, to develop probability curves of streamflow for varying durations.

Geology.—Further progress was made in improving the overall aspects of geologic studies. Emphasis on improvement of investigational procedures has resulted in more efficient collection of pertinent geologic information on dam sites. Considerable attention also has been given to the channel stability and sediment-transport problem.

Design and Construction.—Because the size and complexity of watershed engineering continues to increase, it has become necessary to review some of the existing design criteria and to reconsider the effect of increased duration and frequency of flow through earth spillways.

Definite progress has been made in development of design procedures, tools, and criteria for open channels.

Decentralization of Service soil-testing operations continues, with testing done the past year by the Soil Mechanics Laboratory at Lincoln, Nebr., and by the materials testing sections in the Engineering and Watershed Planning Units at Spartanburg, S.C., Forth Worth, Tex., and Portland, Oreg.

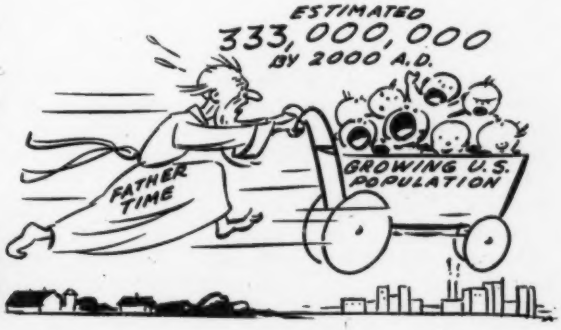
Other Programs

The Soil Conservation Service continued to assist Agricultural Conservation Program participants with permanent-type practices on which cost-sharing was requested. This service was given in approximately 337,000 cases, affecting 314,223 farms and ranches, about 218,218 of which were soil conservation district cooperators.

The Service also provided technical assistance to several hundred participants remaining active the first part of the fiscal year in the subsequently terminated Conservation Reserve Program of the Soil Bank during the year.

It also gave special direct soil survey and farm planning assistance to farmers in Rural Development areas where special funds had been allotted. Later in the year, it joined with other Department agencies in State and local Rural Areas Development planning, through committees and panels being organized for carrying forward an expanded program of rural area improvement in designated counties throughout the country. This activity promised also to call for stepped-up soil survey work and conservation farm planning in the future, in addition to regular technical help given to soil conservation district coooperators.

Also continued was Service help to the Farmers Home Administration in its conservation and watershed loan programs.



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MEGALOPOLIS the Urbanized Northeastern Seaboard of the United States. By Jean Gottmann. 810 pp. Illus. 1961. Twentieth Century Fund: New York, N. Y. $10.00.

"Megalopolis" is a well-written discussion of the social, economic, and political conditions that led to the development of the dominantly urban and suburban 30- to 100-mile wide strip extending along the Atlantic seacoast from southern New Hampshire into Virginia.

The first section of the book discusses the establishment and growth of the 117-county area in 10 States in relation to its geography, topography, and climate. It draws upon, among other documentation, soils and land-capability maps based in part on Soil Conservation Service data. Although this vast megalopolis comprises less than 2 percent of the country's area, it contains more than 20 percent of the population.

Paradoxically, about half of the area is wooded, and in 1950 it produced more than 5 percent of the total value of agricultural products sold in the United States. It thus is, in effect, a huge laboratory in which the processes and results of rurbanization can be observed.

Of special interest is the second section, on land use, followed by two sections dealing, respectively, with largely urban problems and developments, with present conditions and trends, and with actions taken to insure permanence and progress instead of decay.

The chapter on agricultural use of land is a summary of a report by Prof. Edward Higbee of the University of Delaware, after an extensive study of the subject. The author points out that, because of high land values, proximity to markets, and the tempered maritime climate, the area's intensive agriculture consists largely of producing highly perishable market-garden crops and milk and poultry products.

But there is a constant decline in farmland acreage as it passes into urban uses, though the shift is offset in part by increased per acre production, of mostly perishable products. As good cropland is taken over for urban development it is replaced by inferior land, either on the same farm or farther from the cities. The author, who drew upon some material from the recently completed National Inventory of Soil and Water Conservation Needs, makes the point that "land that is not considered cropland today will become cropland, but at the price of much investment" to improve it. He finds that zoning to keep good land in agriculture does not appeal to the many farmers who are thinking of the capital gain to be made when their acres are sold at city prices.

These trends do not mean, however, that agriculture will become extinct in megalopolis. Some farmers will retain their best land, and, by increased use of fertilizers and irrigation, increase production per acre. Others will introduce specialty crops, such as Christmas trees, on the poorer land. Dairymen and poultrymen will find improved methods for using foodstuffs from outside the region. But, as the author emphasizes, proper land planning according to land capabilities is needed, for both agricultural and urban uses.

One chapter treats the apparent trends and the types of forest that are adapated in megalopolis, as well as the need for proper management practices, including those for recreation. The value of forested areas for water supply and flood protection also is stressed.

"Megalopolis" is a most readable, interesting, attractive, and instructive book. It should be a valuable tool in the hands of anyone dealing with rurbanization, from either the rural or the urban approach to its problems.

—HENRY R. ADAMS